



## Reconstruction of Water Resources in Iraq

Thomas A. O'Hara

**Iraqi leaders feared the Tigris River was going to top its banks. Southern Iraqi farmers wondered if there would be any water for the crops in the summer. Hydropower dams were spilling needed water through their gates. Ancient Mesopotamian marshlands in the south had been destroyed, killing or displacing nearly 300,000 residents under the brutal thumb of Saddam Hussein.**

An Iraqi laborer cuts rebar on a concrete barrier Sept. 4, 2004, at a base camp near Basrah, Iraq. More than 500 construction projects are slated to start in Iraq's southern region. Each project is aimed at improving the aging infrastructure and adding thousands of jobs across the region for Iraqi citizens. (Gulf Region Division (GRD) photo by Bill Roberts.)

How do you match environmental needs with agricultural demand and hydropower requirements for a country the size of California with 25 million people in record time? Sounds like a job for the U.S. Army Corps of Engineers (USACE).

## Early Days

In the immediate days following Iraq's liberation, teams from the USACE's initial Task Force Fajr sought out and located key Iraqi advisors who had formerly served as members of the Ministry of Irrigation (MOI). MAJ Regan McDonald, Deputy Detroit District Engineer, met with two MOI representatives April 19, 2003, to begin standing up the ministry. This was part of the overall coalition effort under the Office of Reconstruction and Humanitarian Assistance, led by GEN Jay Garner, which was later reorganized into the Coalition Provisional Authority (CPA) under Paul Bremer.

"When we got here, the Tigris River in Baghdad was 6 feet higher than normal," said McDonald. "We had immediate questions to answer: What's going on? Why is the river so high? Is anybody in charge? Where is all of this water coming from? Are the dams being emptied?"

"A lot of the citizens thought the situation was completely out of control and all of this year's water, and next year's water, was pouring out to the Persian Gulf," said McDonald.

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An Iraqi laborer works on a pump at a water treatment plant in Najaf, Iraq, Sept. 12, 2004. More than 650 projects are underway across the country to rebuild the nation's water treatment facilities, sewage plants, schools, health centers and electricity generators. (GRD photo by Michael Rainey.)

Sitting down and sketching out the rough framework of the nation's waterway system, representatives planted a new partnership in the rubble of Hussein's former regime.

At first, USACE personnel and their Iraqi counterparts worked in the burned-out hulk of what was once the MOI. The existing MOI office had been looted and destroyed following Iraq's liberation. "The looting began after intelligence officials within the ministry burned their records. There was a prison in the basement and a block of houses in back with bars on their windows. Prisoners were detained and tortured in

those buildings," said Dr. Eugene Stakhiv, USACE Senior Advisor, Institute for Water Resources, during the initial efforts in summer 2003.

"It was difficult for all the ministries," Stakhiv continued. "The looting was astronomical. We estimated that the

MOI alone lost more than \$100 million of assets. No communications, maps, reports, files or records were left. We were starting from ground zero while trying to ensure that the Mosul Dam did not fail, the electric power grid was repaired, the water for the irrigation season flowed through proper gates and channels and the 275 pumping stations lifted water onto the fields, farms and municipal water intakes. The Baghdad Zoo and Park had no pumps and no water. Everything was stripped, and we pitched in to fix it."

## Rebuilding Begins

The MOI had 12,000 regular government employees and maintained about 6,000 contract employees, all divided into 5 separate commissions and 11 state-owned companies. As with other utility systems under the regime, the MOI was very stovepiped. Little lateral communication existed among regional directors. Therefore, developing cooperation and simple communication within the ministry was one hurdle the USACE team faced.

"You've got so many incredibly talented Iraqi engineers who have spent 20-30 years completely stifled in their



scientific and technical input,” said McDonald. “Practically every decision made in this country was a political decision — whether it was to build a project or not, or how to operate these systems. So there’s never been a comprehensive, global look at economics or the environment.”

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USACE teams, working with the CPA, had to reestablish the MOI and its communication with the outlying areas. “For 20 days following the incursion, there was no communication,” said McDonald. “Engineers didn’t know who was releasing water

upstream. They didn’t know what damage had been done to the water system due to war, sabotage or looting.”

McDonald and his team issued satellite phones to seven key locations the first day. In addition, CPA teams hit the road to see firsthand the water systems’ condition.

The USACE Dam Safety Assessment Team arrived in May 2003 and visited 20 separate sites throughout northern Iraq providing assessments. “They provided MOI a valuable report that was needed for the budget justification for immediate dam safety repairs,” said Stakhiv.

It turned out that most regions kept operating using their best judgment. In some cases, Iraqis lived at the water control facilities to prevent looting and damage, according to McDonald. With minimal communications in

place, the USACE/Iraqi team began to piece together a database for the country’s waterways.

“For the first few weeks, the daily reports were ‘back-of-envelope’ stuff,” said McDonald. “Every couple of days we’d get handwritten reports saying, ‘This is what’s going on along the Euphrates,’ and adjust accordingly.”

In June, a Marsh Assessment Team from the U.S. Agency for International Development (USAID) traveled all over southern Iraq. “That effort gave the ministry the impetus to get started with its Environmental Analysis Center and begin studying potential restoration sites,” said Stakhiv.

In July, McDonald and SSG Todd Finley, 489th Engineer Battalion, trained 350 new guards for the MOI security force. They were part of the



An Iraqi laborer grinds a plate on a metal support structure at a military training base in Eastern Iraq. The structure will hold a water storage tank that will soon supply the base with clean water. (GRD photo by Mitch Frazier.)

ministry rejuvenation that was moving forward rapidly, spurred by the success of a \$20 million, 100,000-person job program to manually clean 17,000 kilometers (km) (about 10,563 miles) of irrigation and drainage ditches in southern Iraq.

Four marsh-restoration projects were initiated as part of the FY03 budget, which included \$5 million for dam safety repairs and \$13 million for completion of 13 ongoing construction projects. There was nearly \$20 million in additional assistance from two key organizations — the U.N. Food and Agricultural Organization and USAID — for training, modeling, pumping station repairs and equipment for a hydrometeorological network.

### Capacity Building

Using reachback technology, the Baghdad-based team gathered weather reports from the Mobile District and provided that information to the Iraqi teams. In addition, the team coordinated with the Hydrologic Engineering Center, part of the Institute for Water Resources in Davis, CA, to develop a computer model for the Iraqi system.

McDonald sent Iraqi engineers to California to learn to operate computer-modeling technology, then return to train their colleagues in the technology.

On Aug. 11, Interim Minister Mohammad Dhari Al-Shibli changed the ministry's name to the Ministry of Water Resources (MOWR) as a reflection of its larger role in water management. Of all of Iraq's ministries, the MOWR is most like a USACE civil district. For this reason, Stakhiv, McDonald and the rest of the Corps team were able to apply years of USACE expertise and show the MOWR how to expand its operations for a more comprehensive program.

With USACE assistance, the MOWR has moved beyond simple irrigation into a comprehensive water-management role. The expanded role includes an environmental analysis center, a hydrologic analysis center and a modern water-control operations center.

### Standing Up and Moving Forward

On May 10, 2004, less than 13 months after USACE teams first met with representatives from the damaged MOI, Bremer transferred MOWR sovereignty to Iraq. "We accept the responsibility of this institution with pride and respect because we believe in the new Iraq, a democratic Iraq, a free Iraq, an Iraq against terrorism, an Iraq active as a member of the international community which can contribute to the benefit of mankind," said Dr. Abdul Latif Jamal Rashid, Minister of Water Resources.

By summer 2004, the MOWR had overseen clearing 17,000 km of waterways with an additional 20,000 km planned that would employ approximately 100,000 of Iraq's unskilled workforce. Under the relationship with USAID, 30-40 percent of the marshlands have been restored. In addition, thousands of internally and externally displaced Marsh Arabs have returned to resume their indigenous way of life. Economic activities such as fishing, mat weaving, herding and farming are redeveloping in the region. Environmental improvements have led to the return of migratory birds, moderated temperatures and improved air quality. Iraqi

reservoirs are now being operated more efficiently, providing the balance between agricultural needs and a hydropower supply that contributes 20 percent of the nation's electrical needs.

Additional investment in water management system modernization, real-time reporting, computer modeling and information technology will lead to improved coordination throughout the entire MOWR.

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The MOWR, which once operated under a limiting \$1 million budget prior to liberation, is now fueled with an annual budget of \$150 million. An additional \$100 million is committed toward the water resources sector through money donated from the World Bank and the U.N. development group, and \$775 million under the program management office in the water resource sector as part of the supplemental request by President George W. Bush. In all, close to \$1 billion in financial support has been received.

"One of the big challenges will be absorbing that

much help," said McDonald. For an organization accustomed to \$1 million in projects a year, "they have essentially 1,000 years worth of work they are going to accomplish in the next 4 or 5 years. This is an enormous undertaking."

New construction in waterworks control structure and rehabilitation of large dams are part of \$100 million dedicated to solve critical projects. In addition, through the Project and Contracting Office under the U.S.



BG Thomas Bostick, USACE GRD Commander, inspects a water treatment facility in Fallujah, Iraq, an important utility needing electrical power to operate. (GRD photo.)

Embassy in Iraq, the ministry will procure a \$30 million generator for pump stations throughout the country. Reclamation projects to return less-than-desirable land to cultivatable areas will occur. Hundreds of small dams, barrages and wadis in the west will be used to collect spring rains to benefit nomadic herdsman.

### Partnership Continues

While some wondered if the civil works mission belonged under the Army guidon, its importance has shined no brighter than the immediate impact that expertise has had in restoring the water infrastructure in Iraq.

The MOWR has already expressed a desire to continue its relationship with

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USACE. Discussions of a memorandum of agreement between the two nations may need to be developed, but nonetheless, the impact of the Corps' capabilities has been a welcome addition to the Iraq MOWR infrastructure rebuilding efforts.

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"It's a significant impact," said McDonald, referring to the Corps' ability to provide this expertise. "I don't

know how else we could accomplish what we have. To have people in uniform who can bring this expertise in an emergency role, and then immediately

have deployable DA civilians who can show up with years of expertise, is something few organizations can do."

Funded directly through Congress, the Corps' Civil Works Program provides a no-cost resource multiplier for the expertise DOD needs in its efforts to rebuild Iraq's water management system.

Since the initial efforts began more than a year ago, MOWR is now sovereign and operating toward a better Iraq. With the continued help of advisors from water management agencies in the United States, those who oversee the Tigris and Euphrates can now tackle water infrastructure challenges with more expertise and efficiency than ever before.

*Editor's Note: Portions of the article "Iraqi Ministry of Water Resources is Similar to Corps," Engineering Update online, November 2003, by Thomas A. O'Hara and Dr. Gene Stakhiv, and CPA news releases, were used for background information for this article.*

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